

# Consumption Patterns on Food Waste Behavior: A Case Study in Nong Chok District, Bangkok

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## Abstract

This study aimed to study the relationship between consumption patterns and food waste behavior at household level in Nong Chok district, Bangkok. The data were collected with 210 samples by using the questionnaire and analyzed by using descriptive statistics, factor analysis, and Pearson correlation coefficient. Findings showed that most respondents were aged at 46-60 years old and married (and have children). About 38.1% of total respondents have participated in waste separation campaign of the community. For food purchasing behavior and post-consumption management, about 39.0% of total respondents throw out the food surplus, followed by keeping food surplus for the next meals (38.8%), feeding animal (15.7%), and making compost at home (6.5%), respectively. The result of factor analysis can be divided into 5 factors that have unique characteristic. Findings on the relationship between consumption patterns and food waste behavior revealed that lifestyle for consumption pattern on leftover unconcerned, over-purchasing food preferred, and price and promotion conscious causing food leftovers statistically positively affected food waste generation ( $p$ -value < 0.01). Consumption patterns of respondents tend purchase foods over necessary causing food waste continue rising. Thus, promoting food waste reduction and creating awareness of food waste impact on the environment through marketing activities and driving food waste separation to all sectors should be encouraged.

**Keyword:** Food waste behavior/ Consumption patterns/ Community/ Household

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## 1. Introduction

In the past 5 years, about one-third of the global food produced or approximately 1.3 billion tones has been lost or wasted, while 10.8% of the world population remains hungry and more than 62.5% of the world population are in Asia (FAO et al, 2019). In addition, food loss and food waste have led to a significant environmental impact on climate change and global warming, as well as healthy food system. Poor management at each level of food system contributes to food waste such as at the consumer level when consumers purchase more than they need and throw out leftover food, or at the production level where food is damaged during storage or transportation. Thus, reducing food waste is one of the 2030 Agenda for Sustainable Development Goals (SDGs), where goal 12 aims to ensure sustainable consumption and production patterns and target a 50% reduction of food waste by 2030 (United Nations, 2015).

Thailand is one of the countries that faces challenges on food waste generations and waste pollution. In Thailand, the actual amount of food waste has not been collected properly, but has inferred from the amount of organic waste, which are considered as a food waste. The report by Pollution Control Department (2017) revealed that about 17.56 tones or 64% of the total municipal solid waste in Thailand are organic waste, which almost 31% of total waste were disposed improperly (Pollution Control Department, 2021). Food waste management has been long-term problems because Thai consumers are lack of awareness on food waste reduction, waste utilization, and knowledge on proper waste separation. These result in high costs of food waste management after post-consumption and more complicated waste separation process on recycling and disposal. According to SDGs and Thailand's roadmap on the BCG economy, national waste management

plan (2016-2021) has become a direction for preventing food loss and waste with 3Rs concept (reduce, reuse, and recycle) and proper disposal methods among all sectors (NSTDA, 2020). However, the action on food waste management has been slowly implemented to each sector and require long time to adjust to a new behavior, especially at the household level. Some communities have launched a waste management campaign for promoting local food waste reduction, whereas households with various consumption patterns would generate food waste and participate in the campaign differently. Therefore, this study addresses the relationship between consumption patterns and food waste behavior at household level in order to provide strategies to promote food waste reduction and create awareness of food waste impact on the environment and communities.

## 2. Methodology

### 2.1 Questionnaire development

The questionnaire consisted of 3 sections. Section 1 included demographic characteristics of the participants (gender, age, marital status, level of education, monthly household income, household size, and person in charge of meal preparation or food purchase). Section 2 comprised of questions regarding food purchasing behavior and post-consumption management (frequency on grocery shopping, food expenditure, and self-reported amounts of leftover after meals). Section 3 related to consumption patterns which respondents were required to indicate their degree of agreement on a five-point Likert scale (1 = completely disagree; 5 = completely agree).

### 2.2 Data collection and analysis

A sample of 210 respondents in Nong Chok district were analyzed by using descriptive statistics to describe the demographic characteristics, food purchasing behavior and post-consumption management. For consumption patterns, the set of variables within each factor were identified by using factor analysis. The principal components analysis (PCA) is a technique for reducing the dimensionality of data set and compute the components or factors that perform the Kaiser-

Meyer-Olkin (KMO) measure of sampling adequacy above 0.7 are desired (Hoelzle & Meyer, 2013) and the significance level from Bartlett's Test of sphericity below 0.05. Then, Pearson Correlation Coefficient was used to study the relationship between consumption pattern factors and food waste behavior.

## 3. Results and Discussions

The survey sample (n = 210) showed that 67.6% of respondents were female, in terms of age, most respondents aged 46-60 years old (48.1%), followed by 16-30 years old (29.0%). About 51.0% of total respondents have married (and have children) and half of total respondents (55.7%) have level of education below bachelor's degree. Majority of the respondents (54.8%) earned household income less than 20,000 Baht per month. The survey found that 41.4% of total respondents have household size more than 3 people, and 73.8% of total respondents are the primarily responsible for meal preparation or food purchase as showed in Table 1.

Findings on purchasing behavior and post-consumption management found that the frequency of buying raw food materials 1-2 days/week, average food expenditure 100-299 Baht/time. Majority of total respondents generate 10% of food leftover after meal and they choose to throw out unused food (39%), use leftover for the next meal (38.8%), and feed animals (15.7%), respectively. There was only 6.5% of total respondents who use leftover for composting as showed in Table 2.

Results from principal components analysis (PCA) with varimax rotation showed a total variance explained of 59.74%. The KMO achieved a value of 0.769, exceeding the recommended value, suggesting suitable components of 20 variables on consumption patterns. In addition, the Bartlett's test of sphericity was statistically significance ( $p < 0.05$ ), indicating the data's suitability for structural detection. Finally, all factor loadings of measured items that meet the guidance exceeding acceptable level of 0.40 (Williams et al., 2010). Rotated component matrix of five lifestyle for consumption pattern factors was showed in Table 3. Five factors consisted of food awareness and balance, leftover unconcerned, trendy and

**Table 1.** Demographic characteristics of sample n = 210 (number and (%))

Characteristics	Variable	Sample (% percentage)
Gender	Male	68 (32.4%)
	Female	142 (67.6%)
Age	16-30	61 (29.0%)
	31-45	33 (15.7%)
	46-60	101 (48.1%)
	> 60	15 (7.1%)
Marital status	Single	77 (36.7%)
	Married (and have children)	107 (51.0%)
	Married (with no children)	21 (10.0%)
	Divorced	5 (2.4%)
Level of education	Below a bachelor's degree	117 (55.7%)
	Bachelor's degree or higher	93 (44.3%)
Income (Baht/month)	< 20,000	115 (54.8%)
	20,000-55,000	70 (33.3%)
	> 55,000	25 (11.9%)
Household size (person)	1	30 (14.3%)
	2	44 (21.0%)
	3	49 (23.3%)
	>3	87 (41.4%)
Primarily responsible for meal preparation or food purchase	Yes	155 (73.8%)
	No	55 (26.2%)

**Table 2.** Purchasing behavior and post-consumption management n = 210 (number and (%))

Purchasing behavior and post-consumption management	Variable	Sample
Frequency of buying raw food materials (days/week)	Everyday	48 (22.9%)
	5-6 days	35 (16.7%)
	3-4 days	57 (27.1%)
	1-2 days	70 (33.3%)
Food expenditure (Baht/time)	<100	10 (4.7%)
	100-299	102 (48.6%)
	300-499	42 (20.0%)
	>500	56 (26.7%)
Food leftover	10%	120 (57.1%)
	20%	18 (8.6%)
	30%	19 (9.0%)
	40%	4 (1.9%)
	50%	9 (4.3%)
	No food leftover	40 (19.0%)
Post-consumption management (multiple choice)	Eat leftover	138 (38.8%)
	Trash	139 (39.0%)
	Feed animals	56 (15.7%)
	Composting	23 (6.5%)
Waste separation	Yes	80 (38.1%)
	No	130 (61.9%)

convenient preferred, over-purchasing food preferred, and price and promotion conscious. Each factor groups included specific lifestyle for consumption pattern. The first factor group, food awareness and balance contained planning household consumption, rearranging items in refrigerator, balancing raw materials with other foods, and controlling the amount of food meals. The second factor was leftover unconcerned, including having leftover due to over-ordering foods or controlling body weight, and throwing out unused food. Third factor of trendy and

convenient preferred contained trying new products, purchase by following reviews and trends, and preferring food delivery. The fourth factor group was over-purchasing food preferred including buying near-expired food and buying food more than one time consumption. The last factor was price and promotion conscious consisting of buying cheap or discounted food. These factor groups were used to analyze the relationship between lifestyle for consumption pattern and food waste behavior by using Pearson correlation coefficient.

**Table 3.** Rotated Component Matrix

Variables	Factor				
	1	2	3	4	5
Factor 1: Food awareness and balance					
1. planning household consumption	.745				
2. rearranging items in refrigerator	.741				
3. Planning the amount of food to be suitable for consumption	.729				
4. Always check items in refrigerator	.722				
5. Read the label before buying	.695				
6. Buying food by choosing a package size to be suitable for consumption	.649				
7. Controlling the amount of food meals	.522				
8. Always finish their food	.471				
Factor 2: Leftover unconcerned					
1. Having leftover due to controlling body weight		.785			
2. Having leftover due to over-ordering foods		.762			
3. Throwing out unused food		.667			
4. Buying food more than the whole family's consumption.		.571			
Factor 3: Trendy and convenient preferred					
1. Trying new products			.824		
2. Purchase by following reviews and trends			.648		
3. Order food via delivery channel			.577		
Factor 4: Over purchasing food preferred					
1. Buying near-expired food				.705	
2. Buying food they do not particularly like				.646	
3. Buying food more than one time consumption				.564	
Factor 5: Price and promotion conscious					
1. Buying cheap food					.839
2. Buying discounted food					.524

Table 4 presented the correlation between lifestyle for consumption pattern factor groups and food waste behavior, four factor groups are statistically significant ( $p\text{-value} \leq 0.05$ ) including leftover unconcerned, trendy and convenient preferred, over-purchasing food preferred, and price and promotion conscious. Positive correlation coefficient indicated that lifestyle for consumption pattern factor groups statistically positive affected food waste generation. Correlation Matrix of food waste behavior with

the correlation coefficient,  $r$  ranged between 0.137 to 0.384.

Overall, findings of this study supported Quested et al. (2013) who reported a positive association between over-purchasing and food waste behavior, consumers often rely on food shopping routines and admit to regularly buying more food than needed (Evan, 2011), thereby increasing possible food waste, as well as special offer or price promotion are positively related food waste (Stefan et al., 2013; Stancu et al.,

**Table 4.** Correlation Matrix

Lifestyle for consumption pattern factor groups	Food awareness and balance	Leftover unconcerned	Trendy and convenient behavior	Over-purchasing food preferred	Price and promotion conscious	Food waste behavior
Food awareness and balance	1	.000	.000	.000	.000	.096
Leftover unconcerned	.000	1	.000	.000	.000	.310**
Trendy and convenient behavior	.000	.000	1	.000	.000	-.182*
Over-purchasing food preferred	.000	.000	.000	1	.000	.137**
Price and promotion conscious	.000	.000	.000	.000	1	.384**
Food waste behavior	.096	.310**	-.182*	.137**	.384**	1

\* p-value = 0.05, \*\* p-value = 0.01

2016) mainly associated with buying more than what can be consumed (e.g. due to promotions and discounts). According to Tsalis et al. (2021), some studies found that consumers buying price-promoted food products showed average or even lower levels of food waste. Leftover unconcerned statistically positively affected food waste generation. The significance negative association between trendy and convenient behavior and food waste, which is inconsistent with Glanz (2008) mentioned that consumers who bought food because of advertising or trying something new tended to be waste more than food.

#### 4. Conclusions

Due to various lifestyle for food consumption patterns, this study explored the relationship between consumption patterns and food waste behavior at household level. Most respondents generate 10% of food leftover after meals and one-third of respondents choose to throw out unused food, while another one-third of respondents use leftover for the next meal. Results showed that lifestyle for food consumption patterns including leftover unconcerned, over-purchasing food preferred, and price and promotion conscious significantly positive influence on food waste generation. Therefore, it is vital to promote food waste reduction and food waste impact on the environment through marketing activities and social media. The government should cooperate

with the retail businesses to communicate about food waste reduction and building awareness of the negative aspects of food waste. In addition, food waste separation should be encouraged to all sectors, especially at household and community level.

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